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Utilizing Leisure Activities During Upper Extremity Rehabilitation: An Occupational Therapy Treatment Protocol

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UTILIZING LEISURE ACTIVITIES DURING UPPER EXTREMITY REHABILITATION: AN OCCUPATIONAL THERAPY TREATMENT PROTOCOL

by

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This Scholarly Project Paper, submitted by Sherri D. Strohman, OTR/L in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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CHAPTER I

INTRODUCTION

When an individual sustains an upper extremity injury or is recovering from a surgical procedure, loss of independence is noted. Clients are anxious to return to driving, cooking, shopping, writing/typing, and engage in leisure activities. The use of one's arms and hands is central to what one does and who one is. During occupational therapy intervention the client is taken through a process to regain the same level of function that he or she had prior to the injury. Traditionally, during the treatment and intervention process, the therapist may address function of the upper extremity with the use of physical agent modalities, manual techniques, therapeutic exercise and splinting. Therapists practicing today are faced with the economically driven healthcare system with therapists using reductionistic approaches. When the reductionistic approach is utilized the upper extremity is broken down into component parts while the therapist treats the specific dysfunction in hopes of restoring function. Therapists are also driven by time constraints, which leads to the use of pre-set treatment protocols that are based off a specific diagnosis (Burke & Cassidy, 1991). When the therapy is not purposeful to the client and the client is not engaged in an occupation meaningful to them, one could believe that the therapy is not client-centered.

Trombly and Radomski (2002) define client-centered practice as an "approach to service delivery that emphasizes the client's right to autonomy and choice and that focuses intervention on needs defined by the client" (p. 784). In order to provide occupation-based interventions, the therapist must look at the whole person and collaborate with the client in developing interventions that are meaningful to the client.

The domain of occupational therapy is derived from the profession's interest in human beings' ability to engage in daily life activities. The term "occupation" is a broad term used by therapists today. Occupation as defined by the Occupational Therapy Practice Framework (OTPF) is described as "everyday life activity" (AOTA, 2002, p. 610). Occupation can also be summarized as everything people do to occupy themselves, including looking after themselves, enjoying life and contributing to the social and economic structure of their communities (AOTA, 2002, p. 610). The goal of occupational therapy is to facilitate performance changes through engagement in meaningful occupations, which subsequently affect health, well being and life satisfaction. By participating in occupation individuals are dedicated to performance as a product of self-choice, motivation and meaning. Occupation is inherent in the profession's belief in the importance of valuing and considering each individual's desires, choices and needs during the evaluation and intervention process (AOTA, 2002).

According to the Occupational Therapy Practice Framework (AOTA, 2002), a collaborative relationship between the therapist and client is established during the evaluation and continues throughout the entire therapy process. The

evaluation process is focused on finding out what the client wants and needs to do in order to restore function and on identifying those factors that act as supports for or barriers to performance. Throughout the evaluation process, the occupational therapist considers performance skills, performance patterns, context, activity demands and client factors and determines how each influences performance. Through the therapist's skilled observations, use of specific assessments and interpretation of results will lead to a clear explanation of the problems and probable causes in relationship to the client's performance of occupations. The evaluation process is broken down into two steps (AOTA, 2002). The first step is the occupational profile, which addresses the clients needs, problems and concerns about occupation and daily life activity and continues for the duration of the therapy process. The second step is the analysis of occupational performance. Occupational performance is defined in the OTPF (AOTA, 2002) as the ability to participate in activities of daily living, education, work, play, leisure and social participation. The analysis of occupational performance concentrates more on identifying occupational performance issues and evaluating selected factors that support and hinder performance. During this process the client's input is imperative in order for his or her priorities to guide choices and decisions being made during the evaluation process.

Following the evaluation process is the intervention process (AOTA, 2002). The intervention process consists of three steps, which include intervention planning, intervention implementation and intervention review.

During the intervention process information from the evaluation is integrated with theory, frames of references and clinical reasoning to develop a plan and carry it out. Based on the client's priorities this plan guides the occupational therapist. Collaboration with the client is essential to ensure effectiveness and success. The selection and design of the goals are directed toward addressing the client's current and potential problems related to engagement and participation. The focus remains on occupation during the intervention process with efforts being directed towards improving participation in occupations. A variety of therapeutic activities, including engagement in actual occupations and in daily life activities, are used in intervention.

Occupational therapists target, as the profession's overarching outcome, "engagement in occupation to support participation" (AOTA, 2002, p. 619). Participation is a natural effect when clients are actively involved in carrying out occupations or daily life activities that they find purposeful and meaningful in home and community settings. Due to differences in clients, regulators, organizations and pay sources, outcomes will have varying definitions and connotations. Each specific outcome chosen will vary by practice setting and will be subjective to the stakeholders in each setting.

Occupational therapy is in an opportune profession to explore, identify and contribute to the development and fulfillment of participation for individuals with and without disabilities. Having an understanding of the meaning of the term "participation" can have a direct effect on the client's choice of participating and the actual participation in an occupation, whether it be activities of daily living,

education, work, play, or leisure. Law (2002) defines the meaning of participation as "involvement in formal and informal everyday activities. Participation occurs across many locations, including environments for work, school, play, sport, entertainment, learning, civic life and religious expression" (p. 641). Law describes the effects that participation has on client-centered and occupation-based therapy. Research on participation has a direct influence on the power of engagement in occupation. Law cites studies in motor learning by Ma and Trombly (2001) and the effect of activity for persons with and without disabilities by Evard, Lach, Fischer, and Baum (2000), which describe that the performance of an activity is best learned by practicing the actual activity itself. When an individual goes through the process of actively participating in treatment planning and interventions, as in client-centered occupational therapy, this enhances motivation, which in return leads to greater participation.

Occupational therapy focuses on enabling individuals and groups to participate in everyday occupations that are meaningful to them, provide fulfillment and engage them in everyday life. "Occupational therapy at it's best, focuses on occupations important to each person within his or her environment" (Law, 2002, p. 645). "Participation implies being involved, making choices and taking risks" (Law, 2002, p. 646). The client and his or her environment and family are the three factors that directly influence participation (Law, 2002). For participation to be meaningful, there must be a feeling of choice or control over the activity, a supportive environment to facilitate easy attention to the activity, a focus on the task, a sense of challenge from the activity and a sense of mastery.

The client is in control and chooses the focus of interventions. Through a focus on choice, therapists facilitate control for the person receiving therapy services. When this occurs, the end goal is improved health and well being through participation. Performance of an activity is best learned by practicing the activity itself. There are reliable and valid methods by which clients can identify occupations important to them but with which they are encountering difficulty (Law, 2002).

In order to improve the effectiveness and quality of occupational therapy services, the Canadian Model of Occupational Performance (CMOP) is being used as the underlying premise for the development of a treatment protocol using leisure activities to regain upper extremity dysfunction (Law, Polatajko, Baptiste & Townsend, 2002). Using this model an improvement in occupational therapy service provision and client care occurs (Clarke, 2003). The CMOP demonstrates four main advantages consisting of client-centered practice, the focus on occupational performance, specification of assessment and evaluation tools, and the ease of use in practice. The CMOP is primarily concerned with the relationship between occupation, health and well being. It is built on the premise of the uniqueness of individuals, clients' active participation in their therapy, individuals as "whole" beings who affect and adapt to their environment and the intrinsic need for humans to engage in meaningful occupation (Clarke, 2003). According to Grant and Lundon (1998), the CMOP is a multi-faceted model that advocates the importance of occupation, which is defined as what people do to occupy themselves, including looking after themselves (self-care), enjoying life

(leisure) and contributing to the social and economic fabric of their communities (productivity). Occupational components are used to carry out these occupations. "The CMOP illustrates how each person uses physical, affective, and/or cognitive abilities to perform daily occupations in the context of a dynamic physical, social, cultural and institutional environment. The CMOP proposes when disruption occurs in any area of the model then occupational dysfunction occurs" (Grant & Lundon, 1998, p. 4).

The Canadian Model of Occupational Performance is based on the values and beliefs of occupational therapy. Using the CMOP as a guide, this foundation for client-centered practice highlights the different components of an individual's life and seeks to identify how they interact to affect occupational performance (Grant & Lundon, 1998). Grant and Lundon (1998) describe how the physical component of a person's occupational performance takes into consideration all sensory, motor and sensory-motor functions and addresses how these functions allow people to engage in physical activity.

The CMOP enables the client to be an expert regarding his or her unique needs and facilitates the goal-setting process. Theoretical approaches that are specific to the client's needs and goals are then selected to further guide the assessment and intervention process. Client's goals are then identified based on his or her desired future vision and quality of life with the treatment plans designed to help achieve his or her goals, which are implemented through engagement in meaningful occupations. "This is based on the belief that

purposeful activity promotes health and well being and that, through activity analysis and adaptation, change can be affected" (Clarke, 2003, p. 172).

"The CMOP focuses on the client's strengths and limitations and offers a valuable framework for enhancing collaborative client-centered practice" (Clarke, 2003, p. 172). Consideration of the environment is very important with the CMOP. The social environment provides individuals with a variety of roles, which are lost when dysfunction occurs. The CMOP provides a way to understand a client's total environment in order to provide appropriate and meaningful therapy. The CMOP provides focus on observable occupational performance and remediation of dysfunction (Clarke, 2003).

Pollock (1993) reports client-centered practice has been moving to the forefront of occupational therapy during the past two decades due to a number of social influences. Because of the increased numbers of chronic disease, the need for individuals to take responsibility for their health has occurred. Based off of this need, the ideas of "health" are changing for those who have concerns regarding quality of life and lifestyle. There has been a shift in the definition of health over the years. The definition of health has evolved from the medical model theory of absence of disease to the World Health Organization's definition, which includes complete physical, mental and social well being, to more of an emphasis on function (WHO, 2001). With the shift individuals are having an increased need to take more responsibility for their health. Health may then be viewed as the potential to achieve one's preferred goals or perform certain functions (Pollock, 1993). Occupational therapy relies on functional activity and

ties in with the term "health." In regards to health, upon further examination of functional activity, occupational therapy is concerned with occupational performance. Pollock (1993) defines occupational performance as activities that one participates in which are individualized to each person's roles, role expectations and developmental stages. These can be self-care, productivity and leisure activities with influences from societal and environmental factors. Occupational performance is predicated on interaction of the individual's mental, physical, socio-cultural and spiritual performance components. Occupational performance is unique to each individual as each individual's occupational needs and abilities will not be the same.

Occupational therapists need to utilize an evaluation tool that is individualized and sensitive to each client's different needs (Pollock, 1993). Using a client-centered evaluation is one way to address setting goals and assessing change centered on each individual client. Therapists in the past have not used assessment tools that are client specific and include the client's environment. The Canadian Occupational Performance Measure (COPM) was developed and has been used since it is sensitive to occupational performance and the environment (Law et al., 1998). The COPM addresses occupational performance through an individualized measure, which is client-centered and crosses developmental stages. It is an outcome measure designed for use by occupational therapists to evaluate client outcomes in self-care, productivity and leisure-interest areas. The COPM identifies problem areas in occupational performance, assists in goal setting and measures changes in occupational

performance over the course of therapy. The COPM evaluates roles and role expectations within the client's environment while considering the importance of the skill or activity to the client through a semi-structured interview. Advantages of the COPM are that it is client centered, crosses developmental stages and can be used with a physically dependent client to evaluate his or her control over his or her environment. The COPM considers the importance of the occupational performance area and the client's satisfaction with his or her present performance.

The COPM consists of five steps: (a) problem definition, (b) problem weighting, (c) scoring, (d) reassessment and (e) follow-up. During the process of using the COPM the client's true priorities emerge which often times can be different from the treating therapist's priorities. When the client is not identifying the occupational performance deficit areas, the client's self-determination and sense of control over his or her health are reduced, which may appear as non-compliance during therapy. When using a client-centered assessment and therapy goals that are prioritized and established by the client, the potential for active participation and compliance is enhanced (Pollock, 1993).

The COPM allows the client to identify and prioritize occupational performance areas in which he or she is not currently completing at a level at which he or she wants to be functioning. This sets the tone for therapy. If the client identifies that he or she wants to get better so he or she can play horseshoes with friends, this assessment can be used to address the occupational performance problem and the environment, which can also include

the social context. When the client has addressed what is important to him or her, he or she is more invested and compliant with therapy. The COPM supports the opinion that the client is able to take control of therapy and address areas of relevance to his or her needs. This in return allows the client to be responsible for his or her health and his or her own therapeutic process.

Statement of the Problem

When therapists follow the economically driven healthcare system and use pre-set treatment protocols based off of a certain diagnosis, the proven benefits of occupation-based and client-centered practice are missed. Many therapists who follow the pre-set treatment protocols typically use rote exercise as interventions when treating clients because the movements are more pure, more reproducible and more easily measured and compared than movements during occupation-based activity (Cooper, Paquette, Evarts & Moorhead, 1998). Zimmer-Branum and Nelson (1995) described rote exercise as simplistic, repetitive movements that are performed without meaning. By having the client participate in meaningful activities, the quality of performance increases, and it fosters a long-term sense of self-efficacy (Zimmer-Branum, & Nelson, 1995). Occupation-based interventions result in increased range of motion, more organized movement, greater accuracy of movement and longer involvement in tasks (Thomas, 1996). According to Cooper, et al. (1998), when the interventions are not occupation-based the components that are learned and the progress made in therapy does not generalize into daily activities and therefore fail.

Purpose of the Study

In the following chapters, I review literature specific to the principle foundations of occupational therapy, the importance of client-centered practice, the use of occupation-based practice, and upper extremity rehabilitation using leisure activities. I will describe the methods used during the retrieval of information to form the background for the development of my final product. The final product, *Utilizing Leisure Activities During Upper Extremity Rehabilitation: An Occupational Therapy Treatment Protocol*, is to be used as a foundation or basis to use client-centered and meaningful occupation-based practice during rehabilitation of the upper extremity versus using rote exercise. There is room for the treating occupational therapist to provide adaptations for the client while using this treatment protocol.

CHAPTER II

REVIEW OF LITERATURE

To gain a more thorough understanding of occupational therapy and utilizing leisure activities as occupation-based intervention, current literature was reviewed and analyzed. This literature focuses on participation in life and therapy, barriers to client-centered therapy, occupational therapy practice patterns, occupational therapy interventions and evidence, and occupational therapy rehabilitation and outcomes.

Participation in Life and Therapy

Cooper and Evarts (1998) report that occupational therapy in upper extremity rehabilitation should reflect a practice that behaves like occupational therapy. Concern has been expressed by the professionals in occupational therapy that less attention has been given to purposeful activity or therapeutic occupation than to exercise and physical agent modalities, which blurs the ability to differentiate between the practice of occupational and physical therapy. This could be related to occupational therapists aligning themselves with the medical model, which leads to the tendency to specialize. Specialization can lead to a reductionistic approach, which is evident in hand therapy. Treatment tends to be structure-specific and exercise-oriented versus treatment that is activity-based. This could be due to managed care's impact on the business of therapy (Cooper & Evarts, 1998).

Cooper and Evarts (1998) further state that best practice in upper extremity rehabilitation is achieved when occupational therapists place therapeutic occupation and individualized attention to the needs of the client at the center of their interventions. It is difficult to find published material on hand therapy and hand surgery that is qualitative. Most material focuses on quantitative and reductionistic themes. Traditional hand therapy relies on the medical model, which addresses component parts of the client and assumes that component remediation only will lead to restored function. To improve performance the mind and body must be engaged. Through the use of hand activity the client is actively engaging in therapy rather than being a passive recipient of care from the treating therapist.

Isolated exercise alone is unable to produce unique adaptive responses that occur through the use of purposeful activity. By being an active participant in therapy, clients are motivated to perform continued repetitions of motions, which reduces the tendency to anticipate pain. Activities should be meaningful and chosen by the client. The client's choice to actively participate in occupation is based on the meanings connected to the personal life experiences over time. "By giving clients control of the therapeutic process allows them to become agents over their own process of adaptation" (Cooper & Evarts, 1998, p. 22).

Barriers to Client-Centered Therapy

There are a few barriers to client-centered practice as seen in an article by Sumison and Smythe (2000). In this article a list of reasons were cited as therapists' lack of knowledge about client-centered practice, lack of desire to

change to a client-centered approach, a reluctance to take risks, separating personal and professional values, and the therapist's involvement in the medical model. Also therapists feel they do not have the time to use a client-centered approach with lack of time to physically to spend with the clients being reported most frequently. Some therapists and clients may have different goals for the interventions being carried out. By not working together with the client's goals, the person may not understand or find meaning in the interventions and therefore be unmotivated to actively participate in therapy interventions.

In a non-experimental survey design in the format of a quantitative, postal questionnaire all therapists in the United Kingdom's Canadian Occupational Performance Measure Network were selected to participate in a survey (Sumison & Smyth, 2000). Thirty-six responses were received with a response rate of 60%.

There were two aims to this study (Sumison & Smyth, 2000). The first aim was to determine the perceptions of occupational therapists regarding the barrier that is perceived to prevent client-centered practice the most. The top three reasons stated by the respondents on the survey were the therapist and client having different goals, the therapist's values and beliefs preventing themselves from accepting the client's goals, and the third most highly reported perception was the therapist being uncomfortable in allowing the client to choose his or her own goals. The second aim of this study was to identify methods that were being most effective in resolving therapist barriers. The top rated method was to provide case studies in showing how to practice in a client-centered practice

followed by providing management and peer support for use of client-centered practice and a third method of involving all staff in client-centered practice training. In conclusion the study suggests that the perceived barrier is that therapists and clients have different goals as most preventing client-centered practice. It is recommended that therapists explicitly check goals with their clients.

Occupational Therapy Practice Patterns

Neistadt and Seymour (1995) reported on the use of two intervention approaches most frequently being used by occupational therapists with adults in physical dysfunction settings. The first of these approaches is the remedial approach, which addresses the component skills that are necessary to participate in functional activities. The use of this approach addresses skills such as muscle strength, coordination, visual perception and cognition and seeks to correct deficits the client may posses. The second approach is the adaptive approach, which focuses on training clients in actual functional activities to help them regain function. The use of this approach is used to build upon the clients' intact skills. The medical model may have an impact on why therapists are frequently using the remedial approach. Use of this approach is based on the pattern of reductionism. This reduces the client into component parts and skills, which through remediation the parts can be brought back together. Under the medical model the goal of therapy is to normalize the component parts. Through the remediation of the component skills the belief is that the skills will be restored, and the client will be able to function. Therapists have had to document

quantifiably improved function in order to receive third party reimbursement such as Medicare and other private insurance companies. In this reimbursement-type atmosphere, skills are easily more quantifiable through use of the remedial approach versus the outcomes of adaptive functional training.

A twelve-question survey was mailed out to 404 occupational therapy directors in adult physical dysfunction settings throughout the United States with a response from 269 therapists (70.2%) (Neistadt & Seymour, 1995). The questions from the survey were analyzed to determine what activities were being used in each facility, whether they were remedial or adaptive. The research question used was whether or not remedial treatment activities ranked higher than adaptive or functional activities for occupational therapists in adult physical disability settings. The authors report the study did not find a clear-cut dominance of remedial treatment activities over adaptive or functional treatment activities (Neistadt & Seymour, 1995). In the top four ranked activities, two addressed occupational behavior (self-care activities and functional mobility training) and two were aimed at remediation of component motor skills (upper extremity exercise and neuromuscular training) (Neistadt & Seymour, 1995). The lack of clear dominance may indicate that occupational therapy practice is shifting back toward functional treatment activities after a peak of remedial activities being used in the late 1980's. The change may also be attributed to the increasing demands of third-party payers for functional outcomes in rehabilitation. In the past two decades, occupational therapists in adult physical disabilities physical rehabilitation have compromised their values on activity to

meet the expectations for remediation in a health care system oriented toward the medical model (Neistadt & Seymour, 1995). This article shows a shift in the health care system towards using function, which is congruent with the philosophy of occupational therapy. It was recommended that occupational therapists continue to continue to address homemaking and community living skills, as these areas are not as frequently addressed as compared to upper extremity range of motion exercises.

Occupational Therapy Interventions and Evidence

Task-oriented therapy is also important. Bayona, Bitensky, Salter and Teasell (2005), discussed the basic principle of motor learning in which the best way to relearn a given task is to train specifically for that task. Repetition alone, without usefulness or meaning in terms of function, is not enough to produce increased motor cortical representations. In humans less intense but task-specific training regimens using the more affected limb can produce cortical reorganization and associated, meaningful functional improvements (Bayona et al., 2005). A review of literature was completed with the authors comparing task-oriented rehabilitation and constraint-induced movement therapy. The authors further contrasted animal studies and clinical studies within the two categories.

During task-oriented rehabilitation, it was noted that functional reorganization was greater for tasks that were meaningful to the animal. In animals, repetitive activity alone is not sufficient to produce increased motor cortical representations. An element of skilled motor learning is required in addition to repetition for cortical reorganization to occur (Bayona et al., 2005).

During task-oriented rehabilitation clinical studies reviewed by Bayona et al., 2005, it was noted that repetition plays a significant role in inducing and maintaining changes in the brain, however with repetition of a task in the absence of learning new meaningful skills, there is less likelihood that cortical changes of significance will occur. During less intense, task-specific tasks with the affected limb, cortical reorganization and associated meaningful functional improvements will occur. For example, constraint-induced movement therapy in animal and clinical studies demonstrated accelerated recovery of the affected limb, increase cortical representation and improve function. The authors described in detail how repetitive activity alone is not sufficient to produce increased motor cortical representations. Instead an element of skilled motor learning is required in addition to repetition for cortical reorganization and plasticity to occur (Bayona et al., 2005). The authors also reported "Research has demonstrated that rehabilitation may be more successful if the tasks and stimuli are important to the person" (Bayona et al., 2005, p. 59).

Upon altering any component of an occupational form such as material, environment, physical stimuli, human context or the temporal context, the alteration can influence the occupational performance. Sietsema, Nelson, Mulder, Mervau-Scheidel and White (1992) provided definitions of occupationally embedded exercise and rote exercise. Occupationally embedded exercise is used to describe exercise that occurs as a by-product of pursuing task-specific goals. Rote exercise is simple exercise done for its own sake, which is the alternative to occupationally embedded exercise. The purpose of this study was

to compare the movements elicited by occupationally embedded intervention with those elicited by rote exercise. The occupationally embedded exercise was reaching forward with the affected arm to play Simon (i.e., a game in which a sequence is made by flashing lights and sounds through colored pads). All subjects were able to press the pads with their affected hand. The rote exercise consisted of leaning forward and reaching the affected hand outwards upon command.

The participants consisted of 20 adults, 17 men and three women who had sustained a traumatic head injury, but were currently medically stable and functioned at a level four or five on the Rancho Los Amigos scale of cognitive function and ranged from 22 to 54 years of age. A counterbalanced research design was used for this study. This is important as it allowed each subject to be compared under both conditions. Each participant was seen on two separate days one week apart. Subjects reached out their hands in a rote manner during the first session and played Simon during the second session. A warm-up consisting of neurodevelopmental positioning and handling techniques was completed by therapists. Results indicated a preference for the occupationally embedded activity. The participants leaned forward and reached further on the average 12.22cm to play Simon than to complete the rote exercise. Subjects required less cueing during the occupationally embedded activity, and many of the subjects enjoyed playing Simon that they continued to play after the 10 reps had been completed.

Using a quantitative research design, Zimmerer-Branum and Nelson (1995) completed a study to determine what the majority of nursing home residents would prefer to participate in when given the choice: rote exercise or an occupationally embedded exercise. Fifty-two elderly nursing home residents from three different facilities were the subjects in this study. Fifteen men and 37 women ranging from 64-95 years of age participated.

Each subject was randomly assigned to one of four groups. A Fisher-Price basketball hoop was used for the occupationally embedded exercise as the subject dunked a nerf basketball into the hoop, which was placed directly in front of them with the height of the rim at the subject's highest comfortable reach using his or her dominant upper extremity. The rote exercise consisted of the same movement without holding on to the nerf ball. Each participant practiced both the occupationally embedded exercise and the rote exercise. Through a standardized verbal statement from the researcher conducting the study each participant was asked which exercise they would prefer to complete during the five-minute exercise period with the researcher noting what the subject's choice was.

Thirty-six of the 52 subjects chose the occupationally embedded exercise instead of the rote exercise, which is statistically significant. Of the subjects who preferred the occupationally embedded exercise a mean of 21.86 repetitions were completed versus those who chose the rote exercise and completed a mean of 9.0 repetitions. The subjects in this study stated that the occupationally embedded exercise was an original way to participate in an imitation of a sporting

activity, which provided immediate feedback through the manipulation of an object versus moving the body part through the motion.

Melchert-McKearnan, Deitz, Engel and White (2000) completed a single-subject, randomized multiple treatment design to compare two conditions of purposeful activity and rote exercise. Two six-year-old boys who had sustained second to third degree burn injuries involving one or more extremities with potential for impaired mobility in at least one joint were the subjects of this study. Both participants were medically stable and had a medical history that was not significant.

The initial assessment was completed to establish active range of motion measurements using a goniometer and to set appropriate active range of motion goals. The number of repetitions to be completed for the study was determined based on the common clinic practice for the burn unit. A video camera was used to tape the sessions. Four dependent measures that were gathered during each session were number of repetitions of therapeutic exercise completed, number and type of overt distress behaviors displayed, scores on self-report scales of pain intensity and overall enjoyment of the activity.

The scores in the four dependent measurement areas were overall rated higher for the play activities than for the rote exercises. The results are suggestive that as the time progresses following the trauma, the differences in reports of pain intensity and enjoyment of the two conditions become less pronounced. These results lead to recommendations that directions for the

interventions are required; interventions must be monitored and adjusted according to the pain levels and distance from the time of the trauma.

The purpose of the article by Beauregard, Thomas and Nelson (1998) was to determine if a cylindrical doll used during a game would elicit a better reaching motion than using a plain cylinder in two children with upper extremity movement dysfunction while they were playing a game and while performing a rote movement. Two children diagnosed with spastic diplegia cerebral palsy and aged 52 and 59 months participated in the study.

Distinct differences were noted for both subjects regarding the quality of reach during the occupationally embedded movement condition as characterized by fewer movement units (smoother quality of reach), less movement time (shorter in duration) and greater peak velocity. This study clearly demonstrated that the quality of movement was different when reaching for the doll while playing in a game as opposed to reaching with limited meaning and purpose.

Purposeful activity or occupation is the underlying premise of occupational therapy. A purposeful activity should be an activity, which motivates an individual to actively participate and experience intrinsic satisfaction and a sense of mastery in performance areas, such as activities of daily living and leisure. Wu, Trombly and Lin (1993) described occupational form as the objective nature of an activity and occupational performance as the active behavior being elicited by the preexisting occupational form. When the occupational form is changed, this can change the occupational performance. The authors studied the relationship between occupational form and reaching performances from a kinematic

approach. Research data retrieved fell into one of the five dependent variables. The variables include reaction time, movement time, number of movement units, the amplitude of peak velocity, and percentage of reach in which peak velocity occurred (Wu et al., 1993).

Thirty-seven right hand dominant, female college students, ranging from 17-32 years of age, volunteered and received a stipend for their time in the study. All subjects had no history of central nervous system disease. Each subject completed each task with success. There were three experimental conditions in which each subject participated. The first was materials-based, where the subjects would pick up a pencil from a pencil holder and prepare to write her name. The second condition was imagery-based where the subject imagined picking up a pencil from a point in space equal to where the pencil holder would have been located if it were present. Each subject then pretended to prepare to write her name. The researcher documented the position of the imagined pencil. The third condition was rote exercise (Wu et al., 1993).

Results of the study revealed that with respect to movement time, movement units and total displacement, the imagery-based condition elicited enhanced movement quality than rote exercise. However, rote exercises lead to better performance than imagery-based occupations. Through the use of materials-based occupation clients were able to complete enhanced quality of movement during therapy interventions when specifically addressing goals of the client (Wu et al., 1993).

In the field of occupational therapy, purposeful activity is the basis of which the field defines itself with numerous references noted in professional literature. Purposeful activity is thought to provide an intrinsic motivation in which to participate. In the therapy setting, clients provided with an end goal and activities that are of interest to them are more likely to participate in the prescribed therapy regime longer than activities that hold no intrinsic motivation for the clients. Steinbeck (1986) completed an empirical study with the hypothesis that individuals are motivated to perform for longer periods of time when the activity is purposeful. Thirty individuals, 15 male and 15 female, participated in this study. The subjects participated in two tasks designated as purposeful and two as non-purposeful. The dependent variables consisted of the number of repetitions completed for each activity, heart rate and electromyogram measures to establish comparable levels of activity between the subjects. Subjects were randomly assigned to one of eight sequences of activities, including lower and upper extremity activities.

Subjects in this study significantly completed a greater number of repetitions during the purposeful lower extremity exercise activity, completing double the number of completed repetitions than the non-purposeful pedaling activity. Similar results were revealed during the purposeful and non-purposeful hand activities. The interest survey revealed a significantly higher interest in the purposeful activities for both the upper and lower extremity activities. There were significantly higher levels recorded for the heart rate during the non-purposeful pedaling activity and the purposeful hand activity. No significant differences were

noted for EMG between purposeful and non-purposeful lower extremity activities; however, during the purposeful hand activity the EMG levels were significantly higher than during the non-purposeful hand activity (Steinbeck, 1986). This study may have been somewhat limited because subjects were not able to choose what activities they would like to perform.

Rice (1998) completed a quantitative study which focused on analyzing the purposefulness and effects during a materials-based activity and rote exercise on cross transfer training during forearm activity consisting of supination and pronation. Cross transfer involves unilateral training for a given training period after which improvement in performance is noted not only in the trained limb, but also in the untrained limb (Rice, 1998, p. 31). Thirty-six subjects were selected through convenience without any upper extremity neurological or physical impairment, which would affect their function. The participants were randomly assigned to one of three groups, which included the control group, rote exercise group and the imagery-based group. Results revealed a statistically significant difference between the pre-test and post-test times of the materials-based group over the rote exercise and control groups. The movement time performance for the untrained limb of the participants in the materials-based group significantly improved in comparison to the rote exercise and control group performances. The results of this study revealed that clients demonstrated a higher response rate to interventions that they associated with intrinsic motivation for a task that has a specific purpose.

Paul and Ramsey (1998) investigated the materials-based occupation form of using electric paddle drums versus rote exercise to assess the effect on active range of motion of the impaired upper extremity. Twenty participants were selected who had a diagnosis of unilateral cerebral hemiplegia. These subjects were divided into two groups of ten, with one being the experimental group and the other the control group. The dependent variables were active shoulder flexion and elbow extension with the independent variable being the electronic music making activity.

The participants in the experimental group participated in the music group two times per week for thirty minutes for a total of ten weeks. The control group did not participate in the practice but did continue their participation in a physical exercise group with the recreational therapists during the practice times, which encouraged movement of the affected limbs in various positions. The control group participants during exercise time were encouraged to raise their impaired upper extremity as high as they could in different planes.

The range of motion of the shoulder and elbow were measured before and after the ten-week period for both groups in order to compare gains or losses in range of motion between the two groups. The experimental group showed significant improvement in active shoulder flexion and elbow extension; however, the control group showed some improvement in active motion also. It was concluded that something other than just the intervention probably accounted for some of the increase in range of motion, although the intervention enhanced the amount of increase in shoulder flexion and elbow extension in the experimental

group. Based on the results those in the experimental group showed a significant increase in active range of motion. By participating in something meaningful and occupationally embedded the gains were more significant than those in the control group who participated in rote exercise. This is a leisure interest that can be used as a therapeutic intervention to complete rehabilitation of the upper extremity.

Occupational therapy has addressed performance in the areas of occupation since the beginnings of the profession with play being included as one of the performance areas. Occupational performance areas are defined as "various kinds of activities in which people engage, including activities of daily living, instrumental, activities of daily living, education, work, play, leisure and social participation" (AOTA, 2002, p. 620). Play is defined as "any spontaneous or organized activity that provides enjoyment, entertainment, amusement, or diversion" (AOTA, 2002, p. 621). In the pilot study by Hoppes (1997) the use of game playing as used with a geriatric population to improve standing balance was explored. The ten participants in this study were selected through convenience from a skilled nursing facility that ranged from 66-85 years of age with a variety of orthopedic, neurological and pulmonary diagnoses; all were medically stable.

An adjustable height table, various materials such as dominoes, decks of cards, printed materials, tic-tac-toe, towels which each subject could choose from to occupy themselves during the standing task and a stopwatch were used throughout this study. A counterbalanced research design was used for this

study as it allowed each subject to be compared under both conditions. Each subject completed six trials total, with three trials of standing at an elevated table alternating standing tolerance with play and three trials of standing tolerance without play. Play consisted of a game, which each participant chose from a list of suggestions. Non-play activities included reading a paper, carrying on a conversation with another person or folding towels. Trials were completed on different days to avoid fatigue as a limiting factor. The study found that subjects were able to stand for a longer amount of time while participating in play than compared to standing and completing a non-play task. Game playing increased standing tolerance significantly (Hoppes, 1997).

Occupationally embedded exercise and materials-based therapy has become more recognized in the importance of intervention in literature; however, in relation to children and outcomes more studies are being called for. Evidence shows when exercise is embedded into a play occupation; greater range of motion can be elicited. When an individual is presented with an embedded therapeutic task the results are greater than with rote exercise (Sakemiller & Nelson, 1998).

Occupational Therapy Rehabilitation and Outcomes

An example of how therapists measure functional outcomes after outpatient occupational hand therapy is seen in an article by Case-Smith (2003). In this article the author completed a descriptive quantitative study. Many studies in hand therapy have been completed addressing role, activity and impairment-

level outcomes, but no studies have been completed to include measures of the clients' goals.

Thirty-three clients who had been referred to outpatient occupational therapy for hand rehabilitation were included in this study. The most predominant diagnoses were contusions, lacerations, infections and soft tissue trauma, then fractures and crush injuries, then surgeries for various conditions. The mean age of the participants was 44 years of age, and 61% were females. The mean hours of therapy services were 13 hours. Treatment lasted between 6-8 weeks of therapy intervention services. There were four research questions. The research questions consisted of whether or not clients perceive changes in performance and satisfaction on their individualized functional goals as measured by the Canadian Occupational Performance Measure (COPM)?" "Do clients make significant progress in functional performance as measured by the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire?" "Do clients perceive changes in health-related quality of life measured by the Short-Form 36 (SF-36)?" "Do outcome scores on the COPM correlate with outcome scores on the DASH?" (Case-Smith, 2003). Measures of post-test scores and changes were correlated to understand the relationships among the performance levels.

Following the interventions clients clinically and statistically made significant progress in functional performance. When the initial assessment was completed, clients reported experiencing extreme difficulties with activities of daily living and only mild difficulties at time of discharge. At discharge assessment, the clients reported experiencing mild difficulties, and twenty out of

twenty-five clients returned to their former occupations. Priorities identified on the COPM by each client showed a significant increase both clinically and statistically. Scores on the COPM doubled. Given the significant gains on the COPM provides justification that the clients perceived their goals had been met and to their level of satisfaction (Case-Smith, 2003).

Chen, Feely, Neufield, and Skinner (1999) set out to assess factors to predict an increase in compliance of patients with upper extremity orthopedic conditions with their home exercise programs. Compliance has traditionally been defined as "the extent to which a person follows medical or health recommendations, such as taking medications or altering lifestyle" (Chen et al., 1999, p. 171). Patient cooperation and satisfaction with home exercise programs are important for successful outcomes of intervention (Chen et. al., 1999). The study integrated the Model of Human Occupation, Health Belief Model and the Health Locus of Control to assist in identifying satisfaction levels with home exercise programs.

Eligibility criteria included patients who were 21 years of age or older, had an upper extremity impairment, had received a recommendation of a home exercise program by the treating therapist by at least one week before entering into the study and had a willingness to participate in the study given by written consent. The patients filled out three separate self-reports and questionnaires consisting of the Health Belief Model (a 19 item health survey), the Health Locus of Control (an 18 item multidimensional survey), and interests and perceived physical capacity surveys using the Modified Activity Profile.

Patients documented their performances each day, and then their reports were compared to the exercises documented in their medical charts. Results indicated that patients who had higher expectations regarding treatment outcomes tended to be more active in their treatment and therefore demonstrate a higher compliancy rate. It was concluded that if a home exercise program did not fit with a patient's daily routine, the patient was less likely to complete the exercises.

Healy, Iorio and Lemos (2001) evaluated athletic activity following total joint replacement surgeries with recommendations for when patients could begin to participate in the leisure activities they desire to remain active in and enjoy. Following a total joint replacement it is possible for clients to return to an active lifestyle. Some literature reports that physicians discourage clients to perform in high levels of activity secondary to prevention of loosening the implant fixation and minimizing the friction at the joint-bearing surface. However. randomized studies have been completed to disprove this thought with specific athletic activity following total joint replacement.

Healy et al. (2001) discusses that those patients who have participated in sporting activity and achieved a high skill level prior to a total joint replacement have a better chance of returning to those same activities safely following the joint replacement. The technical reconstruction of an arthritic joint is an important predicator of the functional outcome and athletic activity (Healy et al., 2001). With the advanced technology and newer materials being used for the implants, the fear of the implant breaking has been drastically reduced.

Guidelines were developed and included in this article including tables specific to what joint was replaced (Healy et al., 2001). "The prevalence of total shoulder arthroplasty in the United States is less than that of total hip arthroplasty or total knee arthroplasty" (Healy et al., 2001, p. 384). In 1998 the number of total shoulder arthroplasties numbered 15,000; however, with each passing year the numbers continue to increase. Pain relief is the primary indicator for a physician to complete a total shoulder replacement. The longstanding ability of the implant (upon evaluation of 419 replacements completed at Mayo Clinic) was 96% at two years, 92% at five years and 88% at ten years.

As noted by Healy et al. (2001), the average time for a client to return to playing golf following a total joint replacement is between four and four and one-half months post-operative. Members of the American Shoulder and Elbow Surgeons Society were surveyed regarding their recommendations for athletics and sports participation following total shoulder replacement. Forty-two different athletic activities were presented, and the members were asked to recommend when they would allow a client to return to those activities (dependent upon the client's previous level of experience with the activity). For example, an individual who had undergone a total shoulder replacement is allowed to participate in cross-country skiing, swimming, bowling and horseshoes without prior experience. However, the individual is not recommended to participate in golf or shooting if they do not have experience prior to the joint replacement. The guidelines determine this individual should not participate in football, hockey and rock climbing whether they have experience in these activities or not.

Golf participation is a desired outcome activity for many clients seen by occupational therapists. Golf is a popular sport and leisure activity in which an individual can participate in at any age or skill level (Mitchell, Banks, Morgan, & Sugaya, 2003). From the recordings of motion in the groups of golfers it is not surprising to see decreased motion in the senior group, as degenerative changes occur and flexibility decreases with age, and the strokes above par increase. It is important to have data to serve as a baseline reference for assessing disease or injury related to changes in the golf swing and for designing sport-specific exercises and rehabilitation programs (Mitchell et al., 2003).

As the number of golfers increase one can expect the number of golf-related injuries to also increase. Parziale (2002) completed a literature review that found the most predominant golf injury in males was low back injury; however, female golf-related injuries were upper extremity related. Most physicians and therapists are not trained in the full understanding of the biomechanics of the golf swing, and most teaching professionals have little knowledge of the medical pathophysiology and/or rehabilitation interventions.

Parziale (2002) conducted a retrospective, descriptive study of a multidisciplinary golf rehabilitation program that included evaluation by a physiatrist, physician, physical therapist and a Professional Golf Association golf professional. Participants included 109 male amateur golfers with a mean age of 55.3 years, seven male professional golfers with a mean age of 37.1 years, and twenty-nine female amateur golfers with a mean age of 55.9. The most common injury in both the men and women was low back pain, followed by shoulder and

elbow pain. Each participant went through a multidisciplinary program which consisted of an evaluation of patient history and physical examination by the physiatrist, a physical therapy evaluation, including manual muscle testing and range of motion measurements of the spine, shoulders, elbows hips and knees and a golf professional swing analysis. Following the evaluation process the team members met with each participant and reviewed all information collected, and a comprehensive diagnostic and treatment program was implemented, including additional diagnostic testing, medical/surgical intervention, and physical therapy intervention. Many of the participants received more than one type of intervention.

Results were that three of the participants did not return to playing golf secondary to other medical problems. The majority of 142 participants returned to playing golf. No new or additional injuries were reported within the first year of completion of the rehabilitation program (Parziale, 2002). This article demonstrates how using a multidisciplinary team rehabilitation model can allow clients to return to golfing while reducing the rate of future injury. Individuals can often return to playing golf following surgical interventions, illness and injury with appropriate precautions, modification and instruction.

Summary

Currently in occupational therapy practice, therapists are using the medical model, which leads to the tendency to use a reductionistic method, primarily rote exercise to restore function. By using this model, the therapist is focused on remediation of the component parts which will lead to restored

function; however, the client may still be unable to engage in occupations which are important to them.

Occupation, which is used to promote function, is the underlying principle for the profession of occupational therapy. Studies and literature in the field of occupational therapy have shown and proven that use of occupational forms such as materials-based activity has increased the motivation of clients to participate in meaningful activities that is intrinsically rewarding versus rote exercise. Clients prefer to manipulate an object versus moving the body part through a motion. Studies show that through occupation-based interventions the client demonstrates longer duration of participation, smoother quality of movement, and requires less movement time. The gains a client achieves are greater with functional tasks than through rote exercise.

Through the use of the Canadian Occupational Performance Model the client not only assists in the development of goals and interventions, but they are able to quantify when the goals are met by achieving their own level of satisfaction. Clients with higher expectations regarding treatment outcomes tend to be more active in their treatment and therefore demonstrate a higher rate of compliancy. If a home exercise program does not fit within a client's daily routine, the client is less likely to complete the exercises.

Participation in leisure activities is a desired outcome for many clients seen by occupational therapists. Individuals can engage in leisure activities at almost any age or skill level. It is important to have guidelines to follow as to how to re-engage the client in his or her leisure activities. Individuals can return to

leisure activities following upper extremity dysfunction with appropriate precautions, modifications, and instructions. In the following chapters a leisure interest treatment protocol is presented to outline the use of leisure activities (occupation-based treatment) versus using rote exercise to restore upper extremity function in occupational therapy.

CHAPTER III

METHODOLOGY

The development of this treatment protocol stems from my interest in leisure activities, upper extremity dysfunction and occupational therapy. I began to explore current literature and noted that very little literature focused on upper extremity dysfunction and leisure activities in the occupational therapy setting. The information available primarily dealt with leisure activities and the psychosocial aspect of occupational therapy. I completed searches on the PubMed, CINAHL, OT Search and OT Seeker databases using the terms "occupational therapy" and 60 different leisure activities listed individually. I found four articles relating specifically to upper extremity dysfunction and the use of leisure activities during treatment to regain function.

I continued to review current literature however I began to look specifically at the principle foundations of occupational therapy, the importance of client-centered practice, the use of occupation-based practice and upper extremity rehabilitation using leisure activities. This was completed in order to justify the need for treatment protocols for practicing occupational therapists, specific to the treatment of upper extremity dysfunction through the use of leisure activities.

For my product, *Utilizing Leisure Activities During Upper Extremity Rehabilitation: An Occupational Therapy Treatment Protocol*, I developed a list of 60 leisure activities based on interests of clients that I have worked with in the

past as an occupational therapist, my knowledge from my Bachelor of Arts Degree in Exercise Physiology and Leisure Science, brainstorming and completing activity searches using the Internet. The leisure activities were then separated into five groups: Arts/Crafts, Hobbies, Music, Outdoor/Sporting and Sports/Athletics. Through personal communication with an orthopedic surgeon, a physician's assistant and a physical therapist within the Cheyenne, WY community the 60 leisure activities were then sorted into three areas of classification: Allowed/Recommended, Allowed with Restrictions and/or Modifications and Not Recommended. The upper extremity was divided into three areas of dysfunction: Shoulder, Elbow and Wrist. The hand was not included in this treatment protocol due to the level of complexity associated with specific hand dysfunction. During the personal communication with these professionals each of the 60 interests were examined, specific to one area of dysfunction (either shoulder, elbow or wrist) once the client is able to begin active motion of the joint. The restrictions and modifications were established during the personal communication with the professionals along with my clinical knowledge and my activity analysis. Therapists who use this treatment protocol will want to use this as a foundation or basis; however, they will need to seek out the referring provider's approval in order to personalize the protocol. There is room for the treating occupational therapist to provide adaptations for the client while using this treatment protocol.

CHAPTER IV

PRODUCT

According to the Occupational Therapy Practice Framework (AOTA, 2002) finding out what the client wants and needs to do and identifying the factors that support or provide barriers to performance are important to the practice of occupational therapy. Using the Occupational Therapy Practice Framework, the occupational therapist considers performance skills, performance patterns, context, activity demands and client factors to determine how each influence the client's performance. The client develops a sense of mastery when they are in control and choose the focus of interventions, which leads to meaningful participation.

Using the Canadian Model of Occupational Performance (CMOP) provides an opportunity for improvement in occupational therapy service provision and client care (Law, Polatajko, Baptiste, & Townsend, 2002). The CMOP demonstrates four main advantages consisting of client-centered practice, the focus on occupational performance, specification of assessment and evaluation tools and the ease of use in practice. Grant and Lundon (1998) report that the CMOP is a multi-faceted model which includes the importance of occupation, which is defined as: looking after oneself (self care), enjoying life (leisure) and contributing to the social and economic fabric of their communities (productivity). Occupational components are used to carry out these occupations. The CMOP enables the client to be an expert regarding their unique needs and facilitates the goal setting process. The Canadian Model of

Occupational Performance provides a way to understand a client's total environment in order to provide appropriate and meaningful therapy. The CMOP provides focus on observable occupational performance and remediation of dysfunction (Clarke, 2003).

The Canadian Occupational Performance Measure (COPM) is an assessment tool used by occupational therapists which enables the client to identify goals and participate in everyday occupations that are meaningful to them, therefore providing fulfillment and engagement in everyday life versus use of rote exercise to attain treatment goals and objectives. The COPM is an outcome measure designed to address occupational performance in the areas of self-care, productivity and leisure (Law et al., 1998). The COPM connects clearly with the Canadian Model of Occupational Performance, which is concerned with the person-occupation-environment congruence or fit.

Currently, in occupational therapy, minimal literature is documented in using leisure activities to restore upper extremity function in the physical disabilities setting; treatment protocols were not found during the literature review. Much of the documentation of leisure activities lies in the area of psychosocial treatment in the field of occupational therapy. An article by Healy, Iorio and Lemos (2001) evaluated athletic activity following total joint replacement surgeries with recommendations for when the clients could begin to participate in the leisure activities they desired to remain active. Using the information gleaned from this study combined with literature on client-centered and occupation-based treatments utilizing leisure activities, I came up with the idea to develop the

treatment protocol utilizing leisure activities during upper extremity rehabilitation versus initiation of leisure activities upon completion of rehabilitation.

A leisure interest treatment protocol was developed and will be presented here. This leisure interest treatment protocol utilizes occupation-based, client-centered, leisure activities to restore upper extremity function. This protocol is to be used by practicing occupational therapists that treat upper extremity impairment in physical disability settings. This treatment protocol is designed to function as the basis for occupational therapists to individualize treatment plans using leisure interest, occupation-based interventions. The treating occupational therapist will implement use of this leisure interest treatment protocol when the client receiving services is able to begin active range of motion of the particular joint being treated. This leisure interest treatment protocol will assist occupational therapists in using actual occupations, which are leisure in nature to restore upper extremity function versus use of rote exercise.

The list of leisure interest activities was developed based on interests of clients that I have worked with in the past as an occupational therapist, my knowledge from my Bachelor of Arts Degree in Exercise Physiology and Leisure Science, brainstorming and completing activity searches using the Internet. The bank of 60 leisure activities was separated into 5 groups: Arts/Crafts, Hobbies, Music, Outdoor/Sporting and Sports/Athletics. Through personal communication with an orthopedic surgeon, a physician's assistant and a physical therapist within the Cheyenne, WY community the 60 leisure activities were then sorted into three areas of classification: Allowed/Recommended, Allowed with

Restrictions and/or Modifications and Not Recommended. The upper extremity has been divided into 3 areas of dysfunction: Shoulder, Elbow and Wrist. The hand was not included in this treatment protocol due to the level of complexity associated with specific hand dysfunction. During the personal communication with these professionals each of the 60 interests were examined, specific to one area of dysfunction (i.e., either shoulder, elbow or wrist joint). The restrictions and modifications were established during personal communication with the professionals along with my clinical knowledge and my activity analysis. By sorting in this way, the person/client factors, preferred leisure occupation and appropriate environment for the leisure participation may be best outlined for the client. When the leisure interest is classified as "Allowed with Restrictions and/or Modifications" an explanation of the restriction or modification is described on the separate chart "Explanation of Utilizing Leisure Activities During Upper Extremity Rehabilitation."

Initially the treating occupational therapist will follow the referring provider's pre-set rehabilitation protocols for specific upper extremity dysfunction. The leisure interest treatment protocol may then be implemented once the client moves into the active range of motion phase of the referring provider's treatment protocol in place of rote exercise to restore upper extremity function. Therapists who use this treatment protocol will want to use this as a foundation or basis; however, they will need to seek out the referring provider's approval in order to personalize the protocol. There is room for the treating occupational therapist to provide adaptations for the client while using this treatment protocol.

To apply the leisure activity treatment protocol, consider the following case study: A client has been referred to therapy. The client is right hand dominant and has sustained a left Colles' Fracture. They are in a cast and the referring provider is encouraging use of the digits to decrease edema and joint stiffness. The physician has imposed restrictions consisting of no lifting, pushing, pulling or carrying items with the left upper extremity. The occupational therapist has reviewed the leisure interest treatment protocol with the referring provider, with the provider giving approval to use this protocol. The referring provider has instructed the occupational therapist to provide adaptations for the client while using this treatment protocol.

The COPM is being used during the evaluation process in order to identify problem areas in occupational performance, assist in goal setting and measure changes in occupational performance over the course of therapy while considering the importance of the skill or activity to the client through a semi-structured interview. The client has identified the goals and priorities during the evaluation process through participation in the COPM. The client would like to return to playing the piano, bowling, and rock climbing. Currently the client is only able to complete active motion of the digits. The treating occupational therapist uses the criteria set forth from the referring provider (no lifting, pushing, pulling or carrying items with the left upper extremity), incorporates the information gleaned from the COPM (client would like to return to playing the piano, bowling and rock climbing), and integrates all the information while using the leisure interest treatment protocol (*Utilizing Leisure Activities During Upper*

Extremity Rehabilitation: Wrist Dysfunction). According to the treatment protocol the client is able to play the piano without restrictions, but because the client is not able to complete active motion of the wrist, the client is unable to participate in bowling or rock climbing. The occupational therapist may provide the client with suggestions of leisure activities that are appropriate to participate in at this time as long as the activity pertains to active motion of the digits of the left upper extremity while adhering to the physician's restrictions.

Six weeks later the cast is removed and the COPM is used to reassess the client's goals and review the client's satisfaction with their progress and ability to complete the set goals. The referring provider has also made a change to the restrictions and the client is now able to begin to lift, carry, push or pull items up to five pounds. Previously the client identified wanting to play the piano. The client is playing the piano, but is not satisfied with their ability and wants to continue with this goal. At this time of reassessment the client continues to identify wanting to continue with the goals of returning to bowling and rock climbing. Returning to the leisure interest treatment protocol, the occupational therapist finds the interests of bowling and rock climbing; the protocol directs the therapist to allow the client to continue playing the piano with no restrictions and to begin bowling while adhering to the restrictions and modifications reflected in the protocol. According to the treatment protocol rock climbing is not recommended. Therapy sessions consist of participation in the leisure activities of playing the piano and simulated bowling, following the restrictions and

modifications, combined with various treatment modalities of paraffin, ultrasound and electrical stimulation.

At the fourth week following removal of the cast, the client is demonstrating full range of motion of the left wrist and digits during functional tasks to include playing the piano and the movements pertaining to bowling. However during the reassessment, using the COPM, the client demonstrates poor strength in the left upper extremity, which is interfering with their daily occupations. At this reassessment the client reports being very satisfied with their ability to write, drive and play the piano but is not satisfied with their bowling performance. The client continues to identify bowling and rock climbing as their goals. At the time of reassessment the physician increases the weight restriction to ten pounds for pushing, pulling, lifting or carrying items using the left upper extremity. Following the leisure interest treatment protocol the client continues to fully participate in playing the piano with no restrictions, and participate in bowling following the modifications on the treatment protocol. According to the treatment protocol the client is not yet able to participate in rock climbing.

The COPM is used again at week six, following removal of the cast, for reassessment. At this time the client's strength has increased but the client's ability to bowl is still impaired. The physician has changed the weight restriction to allow the client to lift, pull, push or carry up to 15# using the left upper extremity. Treatment continues to increase the weight of the bowling ball as the client tolerates until the client is using the 13# bowling ball, which is the same weight they used prior to injury.

During the seventh week following removal of the cast, the COPM is completed again. The client has met all goals except for returning to rock climbing. The client has a high level of satisfaction with their performance while playing the piano and bowling and the client is discharged from therapy.

The client returns to the referring provider during week eight. The client reports they have returned to their bowling league and are very satisfied with their performance. The referring provider then allows the client to return to rock climbing with the restriction of wearing a soft wrist cock-up splint.

Summary of Leisure Interest Treatment Protocol Process

The treating occupational therapist will use this treatment protocol as a guide throughout the entire rehabilitation process once the client is able to participate in active range of motion. Reassessment using the COPM at key progress intervals is important, as this will assist therapist in how to guide the therapeutic process and the client in how to provide imperative feedback to the treating occupational therapist. Using this protocol, if modifications or changes need to be made to treatment, they can be implemented immediately. The protocol explains in detail how to progress through the leisure activities, following common modifications and/or restrictions imposed during the rehabilitation process. This treatment protocol has many advantages for the occupational therapy treatment collaborators: 1) it will guide the occupational therapist in determining the timing and sequence of client return to valued leisure participation; 2) it will assist communication with the client and referring provider regarding timelines for return to full participation in the desired leisure activities,

and 3) it will advance occupation-based and client-centered therapy, therefore increasing the opportunity for the client being satisfied with their outcome.

Utilizing Leisure Interests During Upper Extremity Rehabilitation: An Occupational Therapy Treatment Protocol

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Utilizing Leisure Activities During Upper Extremity Rehabilitation:

Shoulder Dysfunction

	Allowed/Recommended	Allowed with restrictions and/or modifications	Not recommended
ARTS/ CRAFTS	Ceramics Crocheting Needlepoint Painting Photography Pottery Quilting Sewing Woodworking		
HOBBIES	Board games Card Games (bridge, poker, etc…) Collecting (coins, stamps, bugs, etc…) Videogames (handheld, Game boy, Nintendo, etc…) Writing (typing or handwriting)		
MUSIC	Cello Drums Guitar Harp Piano/Organ Saxophone Trumpet Violin		

	Allowed/Recommended	Allowed with restrictions and/or modifications	Not recommended
OUTDOOR/ SPORTING	Bird watching Canoeing Fishing Gardening Horseback riding Sailing	Archery Backpacking Hiking Hunting (rifle) Scuba diving	Rock Climbing
SPORTS/ ATHLETICS	Aerobics Croquet Frisbee Putt-putt golf Running Shuffleboard Speed walking/jogging Table-tennis/ping pong Weight training (L/E's only using Nautilus equipment)	Bowling Basketball Biking (road, stationary, mountain) Golf Handball Horseshoes Racquetball & Squash Rowing Skiing (cross-country, NordicTrack) Swimming Tennis & Badminton Throwing (football, baseball, softball) Volleyball	Hockey (roller, ice) Ice-skating Roller-blading/Roller-skating Skiing (downhill) Weight training (U/E's)
OTHER LEISURE ACTIVITIES			

Explanation of Leisure Activities Allowed with Restrictions and/or Modifications:

Shoulder Dysfunction

	Leisure Activity	Restriction/Modification
OUTDOOR/ SPORTING	Archery	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Active physical positioning of the bow and arrow • Using a student recurve bow or longbow (which has minimal to no tension) the patient can begin to actively position and release the string • Progressing to an adult sized compound bow setting the tension (poundage) to a low setting which the patient can tolerate, the patient can begin to release the string • Continually assess the patients strength and increase the amount of tension that the patient is able to tolerate until the typical tension (approx. 70 pounds using a compound bow) is achieved which will occur at the end phase of rehabilitation
	Backpacking	When the patient is able to tolerate weight placed directly onto the shoulders: • Use of a lighter pack can be used initially • The weight of the pack can then progressively increase through the remainder of rehabilitation until a full pack weight is achieved.
	Hiking	When the patient is able to tolerate weight placed directly onto the shoulders: • Use of a lighter pack can be used • Hike on trails only
	Hunting (rifle)	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Active positioning of the rifle • Actual firing of the rifle (not until late/end phase of rehabilitation)

OUTDOOR/ *SPORTING*	Scuba Diving	When the patient is able to tolerate weight placed directly onto the shoulders: • Actual scuba diving training in a pool (not until late/end phase of rehabilitation)
SPORTS/ ATHLETICS	Bowling	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic ball and bowling pins (child's play set) the patient can begin to actively position and release the ball towards the pins • Follow the progression of increasing the weight of the bowling ball (beginning with a lightweight ball) and increase the weight as the patient tolerates. • Continually assess the patients strength and increase the size and weight of the ball that the patient is able to tolerate which will occur at the end phase of rehabilitation • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician
	Basketball	No game playing; only shooting the basketball and dribbling Progression for shooting the basketball consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic or nerf ball and hoop (child's play set) the patient can begin to actively position and release the ball towards the basketball hoop • Increase the size and weight of the basketball progressing towards the regulation size specific to the patient's gender and use of a regulation sized backboard and basketball hoop Progression of dribbling: • Active motion and positioning of the upper extremities to complete the task • Begin stationary dribbling of the basketball • Begin dynamic dribbling of the basketball at a walking pace, picking up the pace to be at a full run. Patient must always be in full control of the ball. • Begin lay-ups when the patient is able to shoot a regulation sized basketball maintaining control of the ball • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician

SPORTS/ ATHLETICS	Biking (road, stationary, mountain)	When the patient is able to tolerate weight bearing through bilateral upper extremities: Progression consists of: • Stationary biking • Road biking – when the patient is able to tolerate some vibration through bilateral upper extremities • Mountain biking, which will occur at the end phase of rehabilitation
	Golf	Progression consists of: • Active motion and positioning of the upper extremities in order to complete a full swing • Patient can begin putting during the active phase of rehabilitation. • Begin with chipping and progress the movements from a ¼ swing through a full swing using a dowel • Begin using an iron and progress from a ¼ swing through a full swing using slow, exaggerated upper extremity movements • Begin to increase the club head speed as rehabilitation progresses • Progress to a club, with a longer shaft, such as a 3 wood or driver using a normal golf swing
	Handball	Progression consists of: • Active motion and positioning of the upper extremities to complete the throw • Using a smaller and lighter weight plastic or foam ball, the patient can begin to actively position and release the ball forward • When patient is pain free begin to use a larger ball and throw forward with increasing distance and speed • Increase the size/weight of the ball to regulation size and throw the ball forward with increasing distance, speed and accuracy as rehabilitation continues • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician

SPORTS/ ATHLETICS	Horseshoes	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic or foam horseshoe (child's play set) the patient can begin to actively position and release the horseshoe towards the stake • When patient is pain free begin to use a horseshoe and throw to the stake from a short distance (approximately from 10') • Increase the distance that the patient throws the horseshoe to the stake until the patient is able to throw to the stake from 40' away.
	Racquetball & Squash	Progression consists of: • Active motion and positioning of the upper extremities to complete the stroke • Holding a racquet complete slower movements with no ball • Increase the speed of the racquet with no ball • Begin to hit whiffle balls which are tossed directly to the patient's racquet • Balls tossed to the directly to the patient's racquet with the patient using slow movements to hit the ball • Increase the speed of the balls being tossed to the racquet with the patient increasing the speed of the racquet • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician
	Rowing	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Use dowels bilaterally to complete the rowing motion while seated • Begin to use a rowing machine without resistance • Continually assess the patient's strength and increase the resistance of the rowing machine that the patient is able to tolerate. • Patient to begin rowing on the water which will occur at the end phase of rehabilitation

SPORTS/ ATHLETICS	Horseshoes	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic or foam horseshoe (child's play set) the patient can begin to actively position and release the horseshoe towards the stake • When patient is pain free begin to use a horseshoe and throw to the stake from a short distance (approximately from 10') • Increase the distance that the patient throws the horseshoe to the stake until the patient is able to throw to the stake from 40' away.
	Racquetball & Squash	Progression consists of: • Active motion and positioning of the upper extremities to complete the stroke • Holding a racquet complete slower movements with no ball • Increase the speed of the racquet with no ball • Begin to hit whiffle balls which are tossed directly to the patient's racquet • Balls tossed to the directly to the patient's racquet with the patient using slow movements to hit the ball • Increase the speed of the balls being tossed to the racquet with the patient increasing the speed of the racquet • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician
	Rowing	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Use dowels bilaterally to complete the rowing motion while seated • Begin to use a rowing machine without resistance • Continually assess the patient's strength and increase the resistance of the rowing machine that the patient is able to tolerate. • Patient to begin rowing on the water which will occur at the end phase of rehabilitation

SPORTS/ ATHLETICS	Throwing (football, baseball, softball)	Progression consists of: • Active motion and positioning of the upper extremities to complete the throw • Using a smaller and lighter weight plastic or foam ball, the patient can begin to actively position and release the ball forward • When patient is pain free begin to use a larger ball and throw forward with increasing distance and speed • Increase the size/weight of the ball to regulation size and throw the ball forward with increasing distance, speed and accuracy as rehabilitation continues
	Volleyball	No competitive or recreation play. Progression for volleyball skills consists of: • Active motion and positioning of the upper extremities to complete the desired skill. Begin with setting. • Begin setting by using a lightweight ball such as a balloon progressing to using a beach ball then nerf or rubber outdoor ball • When patient has begun the strengthening phase begin passing by using a lightweight ball such as a balloon progressing to using a beach ball then nerf or rubber outdoor ball • Progress to setting using a regulation volleyball • Progress to passing using a regulation volleyball • Towards the later/end stage of rehabilitation patient may begin serving and attacking (spiking) a lightweight ball such as a balloon, progressing to using a beach ball then nerf or rubber outdoor ball • Patient may then progress to using a regulation volleyball to complete serving and attacking • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician

Utilizing Leisure Activities During Upper Extremity Rehabilitation:

Elbow Dysfunction

	Allowed/Recommended	Allowed with restrictions and/or modifications	Not recommended
ARTS/ CRAFTS	Ceramics Crocheting Needlepoint Painting Photography Pottery Quilting Sewing Woodworking		
HOBBIES	Board games Card Games (bridge, poker, etc…) Collecting (coins, stamps, bugs, etc…) Videogames (handheld, Game boy, Nintendo, etc…) Writing (typing or handwriting)		
MUSIC	Cello Drums Guitar Harp Piano/Organ Saxophone Trumpet Violin		

	Allowed/Recommended	Allowed with restrictions and/or modifications	Not recommended
OUTDOOR/ SPORTING	Backpacking Bird watching Canoeing Fishing Gardening Hiking Horseback riding Hunting - rifle Sailing Scuba diving	Archery	Rock Climbing
SPORTS/ ATHLETICS	Aerobics Biking (road, stationary, mountain) Croquet Frisbee Horseshoes Putt-putt golf Running Shuffleboard Skiing (cross-country, NordicTrack) Speed walking/jogging Swimming Table-tennis/ping pong Weight training (L/E's only using Nautilus equipment)	Bowling Basketball Golf Handball Hockey (ice, roller) Racquetball & Squash Rowing Tennis & Badminton Throwing (football, baseball, softball) Volleyball	Ice-skating Roller-blading/Roller-skating Skiing (downhill) Weight training (U/E's)
OTHER LEISURE ACTIVITIES			

Explanation of Leisure Activities Allowed with Restrictions and/or Modifications:

Elbow Dysfunction

	Leisure Activity	Restriction/Modification
OUTDOOR/ *SPORTING*	Archery	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Active physical positioning of the bow and arrow • Using a student recurve bow or longbow (which has minimal to no tension) the patient can begin to actively position and release the string • Progressing to an adult sized compound bow setting the tension (poundage) to a low setting which the patient can tolerate, the patient can begin to release the string • Continually assess the patients strength and increase the amount of tension that the patient is able to tolerate until the typical tension (approx. 70 pounds using a compound bow) is achieved which will occur at the end phase of rehabilitation
SPORTS/ ATHLETICS	Bowling	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic ball and bowling pins (child's play set) the patient can begin to actively position and release the ball towards the pins • Follow the progression of increasing the weight of the bowling ball (beginning with a lightweight ball) and increase the weight as the patient tolerates. • Continually assess the patients strength and increase the size and weight of the ball that the patient is able to tolerate which will occur at the end phase of rehabilitation • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician

SPORTS/ ATHLETICS	Basketball	No game playing; only shooting the basketball and dribbling Progression for shooting the basketball consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic or nerf ball and hoop (child's play set) the patient can begin to actively position and release the ball towards the basketball hoop • Increase the size and weight of the basketball progressing towards the regulation size specific to the patient's gender and use of a regulation sized backboard and basketball hoop Progression of dribbling: • Active motion and positioning of the upper extremities to complete the task • Begin stationary dribbling of the basketball • Begin dynamic dribbling of the basketball at a walking pace, picking up the pace to be at a full run. Patient must always be in full control of the ball. • Begin lay-ups when the patient is able to shoot a regulation sized basketball maintaining control of the ball • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician
	Golf	Progression consists of: • Active motion and positioning of the upper extremities in order to complete a full swing • Patient can begin putting during the active phase of rehabilitation. • Begin with chipping and progress the movements from a ¼ swing through a full swing using a dowel • Begin using an iron and progress from a ¼ swing through a full swing using slow, exaggerated upper extremity movements • Begin to increase the club head speed as rehabilitation progresses • Progress to a club, with a longer shaft, such as a 3 wood or driver using a normal golf swing

SPORTS/ ATHLETICS	Handball	Progression consists of: • Active motion and positioning of the upper extremities to complete the throw • Using a smaller and lighter weight plastic or foam ball, the patient can begin to actively position and release the ball forward • When patient is pain free begin to use a larger ball and throw forward with increasing distance and speed • Increase the size/weight of the ball to regulation size and throw the ball forward with increasing distance, speed and accuracy as rehabilitation continues • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician
	Hockey (ice, roller)	No game playing. No ice-skating or in-line skating. Only stick handling and puck skills to be worked on. Progression consists of: • Active motion and positioning of the upper extremities in order to complete a full swing • Using a dowel begin to complete a ¼ swing progressing to a full swing using slow, exaggerated upper extremity movements • Patient completes a ¼ swing through a full swing using the dowel while attempting to hit a whiffle ball • Begin to increase the stick (dowel) speed as rehabilitation continues • Progress to using a full sized hockey stick and progress from a ¼ swing through a full swing using slow, exaggerated upper extremity movements • Incorporate a whiffle ball to be hit with the hockey stick • Begin to increase the stick speed as rehabilitation progresses • Incorporate a hockey (plastic) puck while increasing speed of the stick and puck in terms of distance and accuracy • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician

SPORTS/ ATHLETICS	Racquetball & Squash	Progression consists of: • Active motion and positioning of the upper extremities to complete the stroke • Holding a racquet complete slower movements with no ball • Increase the speed of the racquet with no ball • Begin to hit whiffle balls which are tossed directly to the patient's racquet • Balls tossed to the directly to the patient's racquet with the patient using slow movements to hit the ball • Increase the speed of the balls being tossed to the racquet with the patient increasing the speed of the racquet • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician
	Rowing	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Use dowels bilaterally to complete the rowing motion while seated • Begin to use a rowing machine without resistance • Continually assess the patient's strength and increase the resistance of the rowing machine that the patient is able to tolerate. • Patient to begin rowing on the water which will occur at the end phase of rehabilitation
	Tennis & Badminton	Progression consists of: • Active motion and positioning of the upper extremities to complete the stroke • Holding a racquet complete slower movements with no ball/shuttlecock • Increase the speed of the racquet with no ball/shuttlecock • Begin to hit whiffle balls which are tossed directly to the patient's racquet • Toss ball/shuttlecock directly to the patient's racquet with the patient using slow movements to hit the ball/shuttlecock • Increase the speed of the ball/shuttlecock being tossed to the racquet with the patient increasing the speed of the racquet • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician

SPORTS/ ATHLETICS	Throwing (football, baseball, softball)	Progression consists of: • Active motion and positioning of the upper extremities to complete the throw • Using a smaller and lighter weight plastic or foam ball, the patient can begin to actively position and release the ball forward • When patient is pain free begin to use a larger ball and throw forward with increasing distance and speed • Increase the size/weight of the ball to regulation size and throw the ball forward with increasing distance, speed and accuracy as rehabilitation continues
	Volleyball	No competitive or recreation play. Progression for volleyball skills consists of: • Active motion and positioning of the upper extremities to complete the desired skill. Begin with setting. • Begin setting by using a lightweight ball such as a balloon progressing to using a beach ball then nerf or rubber outdoor ball • When patient has begun the strengthening phase begin passing by using a lightweight ball such as a balloon progressing to using a beach ball then nerf or rubber outdoor ball • Progress to setting using a regulation volleyball • Progress to passing using a regulation volleyball • Towards the later/end stage of rehabilitation patient may begin serving and attacking (spiking) a lightweight ball such as a balloon, progressing to using a beach ball then nerf or rubber outdoor ball • Patient may then progress to using a regulation volleyball to complete serving and attacking • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician

Utilizing Leisure Activities During Upper Extremity Rehabilitation:

Wrist Dysfunction

	Allowed/Recommended	Allowed with restrictions and/or modifications	Not recommended
ARTS/ CRAFTS	Ceramics Crocheting Needlepoint Painting Photography Pottery Quilting Sewing Woodworking		
HOBBIES	Board games Card Games (bridge, poker, etc…) Collecting (coins, stamps, bugs, etc…) Videogames (handheld, Game boy, Nintendo, etc…) Writing (typing or handwriting)		
MUSIC	Cello Drums Guitar Harp Piano/Organ Saxophone Trumpet Violin		

	Allowed/Recommended	Allowed with restrictions and/or modifications	Not recommended
OUTDOOR/ SPORTING	Backpacking Bird watching Canoeing Fishing Gardening Hiking Horseback riding Hunting - rifle Sailing Scuba diving	Archery	Rock Climbing
SPORTS/ ATHLETICS	Aerobics Biking (road, stationary, mountain) Croquet Frisbee Horseshoes Putt-putt golf Running Shuffleboard Skiing (cross-country, NordicTrack) Speed walking/jogging Swimming Table-tennis/ping pong Weight training (L/E's only using Nautilus equipment)	Bowling Basketball Golf Handball Hockey (roller, ice) Racquetball & Squash Rowing Tennis & Badminton Throwing (football, baseball, softball) Volleyball	Ice-skating Roller-blading/Roller-skating Skiing (downhill) Weight training (U/E's)
OTHER LEISURE ACTIVITIES			

Explanation of Leisure Activities Allowed with Restrictions and/or Modifications:

Wrist Dysfunction

	Leisure Activity	Restriction/Modification
OUTDOOR/ *SPORTING*	Archery	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Active positioning of the bow and arrow • Using a student recurve bow or longbow (which has minimal to no tension) the patient can begin to actively position and release the string • Progressing to an adult sized compound bow setting the tension (poundage) to a low setting which the patient can tolerate, the patient can begin to release the string • Continually assess the patients strength and increase the amount of tension that the patient is able to tolerate until the typical tension (approx. 70 pounds using a compound bow) is achieved which will occur at the end phase of rehabilitation
SPORTS/ ATHLETICS	Bowling	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic ball and bowling pins (child's play set) the patient can begin to actively position and release the ball towards the pins • Follow the progression of increasing the weight of the bowling ball (beginning with a lightweight ball) and increase the weight as the patient tolerates. • Continually assess the patients strength and increase the size and weight of the ball that the patient is able to tolerate which will occur at the end phase of rehabilitation • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician

SPORTS/ ATHLETICS	Basketball	No game playing; only shooting the basketball and dribbling Progression for shooting the basketball consists of: • Active motion and positioning of the upper extremities to complete the task • Using a lightweight plastic or nerf ball and hoop (child's play set) the patient can begin to actively position and release the ball towards the basketball hoop • Increase the size and weight of the basketball progressing towards the regulation size specific to the patient's gender and use of a regulation sized backboard and basketball hoop Progression of dribbling: • Active motion and positioning of the upper extremities to complete the task • Begin stationary dribbling of the basketball • Begin dynamic dribbling of the basketball at a walking pace, picking up the pace to be at a full run. Patient must always be in full control of the ball. • Begin lay-ups when the patient is able to shoot a regulation sized basketball maintaining control of the ball • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician
	Golf	Progression consists of: • Active motion and positioning of the upper extremities in order to complete a full swing • Patient can begin putting during the active phase of rehabilitation. • Begin with chipping and progress the movements from a ¼ swing through a full swing using a dowel • Begin using an iron and progress from a ¼ swing through a full swing using slow, exaggerated upper extremity movements • Begin to increase the club head speed as rehabilitation progresses • Progress to a club, with a longer shaft, such as a 3 wood or driver using a normal golf swing

SPORTS/ ATHLETICS	Handball	Progression consists of: • Active motion and positioning of the upper extremities to complete the throw • Using a smaller and lighter weight plastic or foam ball, the patient can begin to actively position and release the ball forward • When patient is pain free begin to use a larger ball and throw forward with increasing distance and speed • Increase the size/weight of the ball to regulation size and throw the ball forward with increasing distance, speed and accuracy as rehabilitation continues • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician
	Hockey (ice, roller)	No game playing. No ice-skating or in-line skating. Only stick handling and puck skills to be worked on. Progression consists of: • Active motion and positioning of the upper extremities in order to complete a full swing • Using a dowel begin to complete a ¼ swing progressing to a full swing using slow, exaggerated upper extremity movements • Patient completes a ¼ swing through a full swing using the dowel while attempting to hit a whiffle ball • Begin to increase the stick (dowel) speed as rehabilitation continues • Progress to using a full sized hockey stick and progress from a ¼ swing through a full swing using slow, exaggerated upper extremity movements • Incorporate a whiffle ball to be hit with the hockey stick • Begin to increase the stick speed as rehabilitation progresses • Incorporate a hockey (plastic) puck while increasing speed of the stick and puck in terms of distance and accuracy • Begin to play with peers in regular playing environment upon discharge from therapy and approval from physician

SPORTS/ ATHLETICS	Racquetball & Squash	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Using a racquet complete slower movements with no ball • Increase the speed of the racquet with no ball • Begin to hit whiffle balls which are tossed directly to the patient's racquet • Balls tossed to the directly to the patient's racquet with the patient using slow movements to hit the ball • Increase the speed of the balls being tossed to the racquet with the patient increasing the speed of the racquet • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician
	Rowing	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Use dowels bilaterally to complete the rowing motion while seated • Begin to use a rowing machine without resistance • Continually assess the patient's strength and increase the resistance of the rowing machine that the patient is able to tolerate. • Patient to begin rowing on the water which will occur at the end phase of rehabilitation
	Tennis & Badminton	Progression consists of: • Active motion and positioning of the upper extremities to complete the task • Using a racquet complete slower movements with no ball/shuttlecock • Increase the speed of the racquet with no ball/shuttlecock • Begin to hit whiffle balls which are tossed directly to the patient's racquet • Toss ball/shuttlecock directly to the patient's racquet with the patient using slow movements to hit the ball/shuttlecock • Increase the speed of the ball/shuttlecock being tossed to the racquet with the patient increasing the speed of the racquet • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician

SPORTS/ ATHLETICS	Throwing (football, baseball, softball)	Progression consists of: • Active motion and positioning of the upper extremities to complete the throw • Using a smaller and lighter weight plastic or foam ball, the patient can begin to actively position and release the ball forward • When patient is pain free begin to use a larger ball and throw forward with increasing distance and speed • Increase the size/weight of the ball to regulation size and throw the ball forward with increasing distance, speed and accuracy as rehabilitation continues
	Volleyball	No competitive or recreation play. Progression for volleyball skills consists of: • Active motion and positioning of the upper extremities to complete the throw • Begin setting by using a lightweight ball such as a balloon progressing to using a beach ball then nerf or rubber outdoor ball • When patient has begun the strengthening phase begin passing by using a lightweight ball such as a balloon progressing to using a beach ball then nerf or rubber outdoor ball • Progress to setting using a regulation volleyball • Progress to passing using a regulation volleyball • Towards the later/end stage of rehabilitation patient may begin serving and attacking (spiking) a lightweight ball such as a balloon, progressing to using a beach ball then nerf or rubber outdoor ball • Patient may then progress to using a regulation volleyball to complete serving and attacking • Patient begin to play with peers in and return to full court games at conclusion of rehabilitation and approval from physician

CHAPTER V

SUMMARY

The Upper Extremity Rehabilitation Occupational Therapy Treatment Protocol was developed to be used as a foundation, or basis, to incorporate client-centered and meaningful occupation-based practice during rehabilitation of the upper extremity versus using rote exercise. During the literature review it was found that the use of leisure activities during the rehabilitation process was focused in the realm of the psychosocial aspect of occupational therapy practice versus physical disabilities. Many of the practicing occupational therapists working today in physical disabilities practice settings are using reductionistic techniques for treatment and they are not utilizing client-centered and occupation-based interventions. Therefore needs of the clients are not being met in regards to daily occupations.

The few articles that were found during the literature search specific to use of leisure activities and upper extremity rehabilitation gained my attention and I began to look specifically at the principle foundations of occupational therapy, the importance of client-centered practice, the use of occupation-based practice and upper extremity rehabilitation using leisure activities. Zimmerer-Branum and Nelson (1995) found in their study that elderly nursing home residents preferred to participate in an occupationally embedded exercise instead of rote exercise.

Participants reported that the occupationally embedded exercise was an original way to participate in an imitation of a sporting activity, which provided immediate feedback through manipulation of an object versus moving the body part through the motion. The results of a study by Beauregard, Thomas and Nelson (1998) determined that reaching for a doll while playing in a game elicited a smoother quality of reach, required less movement time, and greater peak velocity achieved as opposed to reaching with limited meaning and purpose. It was shown in the study by Paul and Ramsey (1998) that clients who participated in the meaningful leisure activity of playing the drums made significant gains in active motion of the shoulder and elbow than those who participated in rote exercise. This study demonstrated that clients who participate in treatment utilizing a leisure interest make gains towards goals, which they are able to carry over in their daily routines (Paul and Ramsey, 1998). The results from these studies indicate that client-centered and occupation-based practice is valuable to clients and treating therapists.

Due to these findings occupation-based intervention with the primary focus on leisure activities was used to develop the Upper Extremity Rehabilitation Treatment Protocol for occupational therapists. Secondary to the minimal amount of literature published specific to upper extremity rehabilitation using leisure activities, the need was justified for development of treatment protocols for practicing occupational therapists in the area of upper extremity dysfunction rehabilitation.

The importance of measuring outcomes following outpatient occupational therapy services is vital to understand. Many studies in hand therapy have been completed addressing role, activity and impairment level outcomes, but no studies have been completed to include measures of the clients' goals. A case study completed by Case-Smith (2003), indicated that an effective way of developing client-centered goals and incorporating them as interventions in order to measure progress was to use the Canadian Occupational Performance Model (COPM). The COPM is an effective assessment to develop client-centered goals and utilize the goals as treatment interventions.

One specific article led me toward the development of a specific treatment protocol utilizing leisure activities. An article by Healy, Iorio and Lemos (2001) evaluated athletic activity following total joint replacement surgeries with recommendations for when the client's could begin to participate in the leisure activities they desired to remain active in and enjoy. From the information gleaned from this study and lack of literature on client-centered and occupation-based treatments utilizing leisure activities I came up with the idea to develop the treatment protocol utilizing leisure activities during upper extremity rehabilitation versus initiation of leisure activities upon completion of rehabilitation.

Occupational therapists who implement this treatment protocol will need to seek out the referring provider's approval in order to initiate and personalize the protocol. This protocol serves as a guide for occupational therapists to incorporate leisure activities, which a client may deem a treatment priority and goal, following the modifications and restrictions already established through my

activity analysis. The treating therapist will also be able to provide individualized adaptations for the client while using this protocol.

The limitations for this project's utilization is that few studies have been completed specific to upper extremity dysfunction to serve as a resource and use of leisure activities as interventions in the physical disabilities realm of occupational therapy is not common to current practice. The literature available primarily dealt with the use of leisure activities in the psychosocial aspect of occupational therapy.

It is important for occupational therapists to follow the underlying principle of what occupational therapy is. That principle is to facilitate performance changes through engagement in meaningful occupations, which affect health, well-being and life satisfaction. Through activity analysis and adaptation, change can be effected. When using a client-centered assessment, and therapy goals are established and prioritized by the client, the potential for active participation and compliance is enhanced and the positive changes in function are carried over into daily occupations.

Development of the treatment protocols for upper extremity dysfunction utilizing leisure activities is the beginning of bringing occupation-based and client-centered practice back to the forefront of occupational therapy services in the area of physical dysfunction. By using occupation-based practice occupational therapists can move away from the medical model, which tends to be reductionistic in nature.

Future steps to this project could be to complete case studies utilizing the treatment protocols to gather more data on the effectiveness of using leisure activities versus rote exercise during upper extremity rehabilitation when the client is able to begin active motion. Research could also be geared toward developing an interest survey for orthopedic physicians to gather more data regarding their opinions as to what activities can be initiated during the rehabilitation phase. Educating physicians about the positive effects of engagement in occupation-based practice could also be a next step towards moving away from the medical model of reductionism and treatment of only performance components. A leisure interest treatment protocol specific to the hand could also be developed. It is anticipated that this client-centered, occupation-based treatment protocol will improve functional outcomes among clients and increase the use of occupation-based interventions in upper extremity rehabilitation.

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